

III. *On Erebia palarica*,* n. sp., and *Erebia stygne*; chiefly in regard to its association with *E. evias*, in Spain. By Dr. THOMAS A. CHAPMAN, M.D.

[Read December 7th, 1904.]

PLATES II, III, IV, V, VI.

IN 1902 I reported that *E. stygne*, Ochs., had not been recorded as occurring in Spain. In this I am not quite sure that I was not correct, but at any rate, if not recorded, the Entomologists of Madrid were certainly aware that the species occurred in the Sierra Guadarrama, as they have specimens in their collections, and have it noted in their MS. lists. I am not aware that even now any Spanish localities are known beyond this one, except these recorded in our Proceedings by Mrs. Nicholl and myself.

In 1902 and 1903 I met with forms of *E. stygne* in Spain, that led me to make sundry observations on that species to the Society, in connection with specimens exhibited. Mrs. Nicholl also met with the species in 1902, and also Prof. Poulton, and I was able to make some remarks on their specimens which were exhibited at our meetings. Amongst the general remarks I hazarded, I expressed the opinion that *Erebia stygne* in Spain was well worthy of further observation, and study. My observations during 1904 have, I think, fully confirmed the soundness of this opinion, but though adding something to our knowledge, they leave the necessity for further research in regard to the species and those allied to it, at least as cogent as before.

It may perhaps be well, before relating last season's

* *Palarica*, from habitat, Pajares. Pajares is said to mean a place with much fodder and litter, as if *Palaeres = cum multas paleas*; a bad (and I am not sure that this is a bad) excuse for getting rid of the j, is better than none, as the Spanish j = Scotch ch, is shibboleth to the South Briton; Spanish j is often = Latin l, e.g. mejor—melior. I should have liked to have given the name *nicholli*, in honour of Mrs. Nicholl, who first took the species two years ago, but this would lead to confusion with *Erebia glaciatis*, var. *nicholli*, Oberth.

experience, to recapitulate our previous knowledge of *E. stygne* as a Spanish species.

I found in 1902 a very large and brightly-coloured race of *stygne* at Bejar, which I named *bejarensis*,* and exhibited to the Society on Nov. 5th. At the same meeting † Mrs. Nicholl exhibited a large and small form of *stygne* from the Picos de Europa. Of the large form which is no doubt identical with *palarica*, there were only two poor specimens, and all the evidence went to show they were a form of *stygne*, but coming from the same locality as a small form, it added an important item of interest to the species.

In the following year, I took at Canales de la Sierra a fairly large form of *stygne*, associated mimetically with a small form of *E. evias*, nearly, if not absolutely identical with Zapater's *evias*, var. *hispanica*, so I gave the same varietal name to the form of *stygne*. These facts are reported in the Proc. Ent. Soc. 1903, pp. xlv *et seq.*

Still later the President enabled me to show the Society (Proc. 1904, p. xlvi) two *Erebias* from the Guadarrama, which confirmed the existence of *stygne* there, and also showed that it was there accompanied by a specially modified form of *E. evias*.

It further happens that *E. evias* accompanied the small *stygne* taken by Mrs. Nicholl at the Picos, though this had not been recorded when I examined the specimens with a view to the present report.

All the forms of *stygne* so far known from Spain therefore seemed to be no doubt varieties of that species, some of them modified to agree with *E. evias*. There was nothing in any of the forms that did not appear to be well within the limits of variation.

Mrs. Nicholl has an interesting note on the *stygne* of the Picos in Ent. Record, vol. xvi, p. 48. I may quote some items of this, as I cannot find any details of Mrs. Nicholl's observations on the Picos *Erebias* in the Society's Transactions.

July 10th. "Encamped at a height of nearly 5000 ft. on the southern face of the chain, and found the mountain pastures just above this level, swarming with *E. stygne*. Both sexes were out and in good order, though some of the males were slightly worn. I caught a good many and kept a few; they were quite typical specimens, per-

* Proc. Ent. Soc. 1902, p. xxxvi.

† l. c., p. xxxv.

haps a trifle larger than those from Dauphiné and the Pyrenees."

On the 19th, "*stygne* was nearly over." Mrs. Nicholl tells me that she also took *evias* ("mostly worn, rather large type, and high up, none low down").* I have already noted two specimens of *evias* are mixed with the *stygne* (no doubt some of the few noted above) from the Picos in the drawers at South Kensington. I incline to think they were *not* so mixed by Mrs. Nicholl, but, whoever did so, afforded a proof that the high-level July *evias* from the Picos does, in some of its specimens at least, closely resemble the *stygne* of the same time and place. The note in the "Record" proceeds: "On July 22nd, at a height of 3000 to 3500 ft. I saw several large *Erebias*, quite fresh out. I caught six or seven specimens, all males, and considered them to be *E. æthiops* and therefore only kept a couple, . . . they turned out to be very large specimens of *E. stygne*." These two specimens are *E. palarica*. Both specimens are, however, poor, the one in the British Museum, the best, is very far from fresh, so that the difference of date between *E. palarica* and *E. stygne* is less than Mrs. Nicholl's note implies. They are no doubt on the wing at the same time at the Picos, as I found them this year at Pajares. I must take my share of responsibility for declaring these specimens of *palarica* to have been *stygne*. They were very much the same size as my *E. stygne*, var. *bejarensis*,† with which I was then busy. So that their large size did not suggest specific difference, whilst the genitalia of the specimen I examined, though not quite typical *stygne*, were within the limits of variation found in these appendages in other species of the genus. With the small amount of material available the conclusion seemed clear that it must be regarded as a var. of *stygne*, possibly near var. *bejarensis*, both being very large, but certainly requiring further investigation.

We now come to my observations of the present year (1904). From July 8th to July 22nd, Mr. Champion and I stayed at Puerto de Pajares, which is the pass across the Cantabrian Mountains followed by both the road and the railway from Leon to Gijon, at an elevation of about 4500 ft., and at several places in the neighbourhood we

* See Notes on *evias* later.

† (The specimen in B. Mus. is 56 mm.; small for *palarica*, a maximum for *bejarensis*.)

found a large and a small form of *stygne*, which, there can be little doubt, with probably some trifling local variations, are the same two forms as those taken by Mrs. Nicholl at the Picos de Europa. In one respect our observations, though confirming Mrs. Nicholl's, show that the apparent conclusion to which they pointed is incorrect. Mrs. Nicholl found one form at a high, and the other at a low level, and the deduction was, that it was the habit of the two forms to be separated by being adapted to living at different elevations, even if the lower one were not a second brood possible at the warmer station.

Well, we found one form at a low, and the other at a high level, but then again we found precisely the contrary case, in fact we found both forms at all levels from about 4000 ft. to over 6000 ft. The small form maintains its characters both at a high and low level, as does also the large one.

We found, however, that each species had definite localities, within which the other did not occur, and in the case of two such localities for the small species, and also of two for the large, the localities seemed to be very definitely circumscribed. The species were found in other places in which also the habitats may have been as definitely marked out, but it did not happen that our examination of them was sufficiently minute to justify an opinion. Indeed, of those I regarded as well defined, this is of course only true in regard to certain directions, but these directions were sufficiently numerous, being in fact the directions from which we turned back when collecting them, because no more were to be seen, to justify the broad statement.

I must go into a little more detail as to the reasons that led me to consider the large form *palarica*, to be a distinct species from the small one, which I regard as a local form of *stygne* very close to my var. *hispanica*.

The first and obvious reason is the difference in size. Size one regards usually as of little value as a specific character, and if it were in this case to stand alone, I should, as I did in the case of var. *bejarensis*, attach no importance to it. The size is, nevertheless, in this case a very marked and unmistakable character. I have measured all the specimens I brought home, and the result of measuring 55 ♂ 11 ♀ of *stygne* from Pajares, and 115 ♂ and 37 ♀ of *palarica* is, that the most dwarf *palarica* is 1 mm. larger than the most giant *stygne* (*hispanica*), and

that the mean expanse of the two species differs by no less than 11 mm., nearly half-an-inch. The smallest ♀ ranging in size very close to *stygne*, var. *hispanica*, has a facies quite characteristic of *palarica*, so that no one could confuse them together.

Palarica is indeed the largest of all the *Erebias*, averaging 59.0 mm. in expanse, and ranging from 55 mm. to 64 mm.

The largest *Erebia* according to Ruhl is *parmenis*, to which he gives an expanse of 50 mm. to 55 mm. *E. cyclopius* is as large, and *embla* very nearly so. I find, however, that *evias* goes to 54. mm., but this is a maximum. *Palarica* has 59 mm. as an average.

In size, *stygne*, at Pajares, and *palarica* do not overlap; the largest of the one is smaller than the smallest of the other.

The next point is that each was, wherever we closely observed it, strictly confined to its own habitat, into which the other did not trespass; this was very remarkable at two points where the areas occupied by each approached to within a few dozen yards of each other. At one of these places opportunity served for me to notice how sharply defined was the margin of the territory of each species, and how a specimen driven over the border, came back after a very short detour. Nor did I ever find one butterfly where I found the other though it might not be very far off.

Still it is difficult to suppose, considering how common they were in places, each in its own area, and how close these areas often were, that specimens did not sometimes visit the habitats of the other species, though I did not meet with such a case. And if they did and they were really all one species some crossing was to be expected, and intermediate forms ought to have occurred. Yet I must have seen many hundreds of specimens altogether of both species. In most places there was some difficulty in taking specimens, and sometimes only two or three were taken out of a score seen, and of these taken, though many wretched specimens were retained, a large number in poor condition were discarded. Those brought home must therefore be but a portion of the number of individuals from which I draw conclusions. Yet there never was the slightest difficulty in saying at once, of which species any particular specimen was. There was no trace of intermediate or transitional forms or of hybrids. Considering how

easy, even inevitable, crossing must have been, had they been merely forms of one species, I see no means of avoiding the conclusion that the two forms are asyngamic. Such an attitude towards each other, seemed to be regarded as the truest test of specific distinctiveness of two forms, when the subject of "what is a species" was debated at our meeting last Spring. The difficulty is to put it to experiment. In the case of *Ercbia palarica* nature has provided the experiment, and the answer is distinct. Usually she separates the subjects of experiments so widely by time, place, and season, that the answer we have to form is a purely personal one, viz. *I think* if the experiment were made the answer would be so and so. It was in this way that I concluded, and still hold that all the Spanish forms of *stygne* previously known to me are of one species.

When we examine the insects themselves for confirmation of this conclusion, we first have size, usually a poor specific character, but here so marked and constant as to have some weight. Then as to markings, the rusty blotches in both species are divided into sections by the more or less dark lines of the nervures, and each section in the interneural spaces of the fore-wing has a definite form that differs completely in the two species, and is constant in every one of the large number I have examined. In *stygne* the interneural blotch on its basal margin is stretched out centrally into a more or less full convex margin, as if the nervures carried the dark ground-colour into the blotch, and so forced it to swell out into the intervals. In *palarica*, each interneural blotch falls away from the base in its mid-neural line, forming a more or less deep notch. This is most marked in the blotch between nerves 3 and 4, where the ocellus is weak or absent. This blotch is also shorter than the others as if it failed with the ocellus, whilst in *stygne*, though the ocellus may be wanting, this blotch stretches inwards at least as strongly as the others. The result is an hour-glass shape of the rusty mark on the fore-wings, contrasting with the characteristic outline in *stygne*. In the ♀ the rusty blotch is continued up to the costa, with a deflection basewards, by a whitish-grey shade, of which any trace is wanting in *stygne*. The blotches on the hind-wings have a similar character. The blotch of each ocellus is much the same in both species when it is reduced, but when it is pronounced and large, it differs

markedly in the two species. In *stygne* it extends basally in a rounded or even pointed projection in the middle of the interneural space, leaving the nervures, pronounced as sharp angular interruptions. In *palarica* the blotches extend inwards rather along the nervures than centrally, and the ocelli never bear the aspect of being at the outer end of the blotch as they so often have in *stygne*. *Palarica* never follows *stygne* in this character of the hind-wing, but a few *stygne* have a little of the tendency of *palarica*.

I have one specimen, and one only of *E. stygne* ♀, that so far traverses some of these distinctive points, that it may really be a hybrid. It is small like *stygne*, but has the inner margin of the blotches of the hind-wings like *palarica*. The blotches of the fore-wings are not distinctive, but the large double apical ocellus is placed in the blotch very much as in *palarica*. In *stygne* these ocelli are usually nearer the outer than inner margin of the blotch, in *palarica* they are quite median.

To resume the distinctive characters of *palarica* and *stygne*, the under-side shows some slight differences. In both, the under-side of the hind-wing in the ♂ is often smooth, black and polished, with little or no marking, this is in fact the rule in *stygne*, and it is often difficult to make out the central darker band, and when seen it appears to have rather a smooth margin. This form is rare in *palarica* and generally the central band is quite conspicuous, and in a few instances has some white markings just outside its outer border. This border is always carried outwards in the interneural spaces, and the general facies is much more that of *evias* than of *stygne*. The markings are usually very distinct, with *stygne* one cannot find a specimen marked enough to make a satisfactory comparison. The ♀ *palarica* under-side differs from that of *stygne*, var. *hispanica*, in being less brown, more grey, and in being more distinctly marked, the basal margin of the central band being obscure or wanting in most *stygne*. There is, however, much variation in both species. If the difference be noted as a slight resemblance in the facies of the under-side of the hind-wings to *evias*, wanting in *stygne*, then we find that var. *peñalaræ* of *stygne* goes nearly as far in this direction as *palarica*, and var. *bejarensis* goes much further.

A distinctive character is the structure of the clasps of

the male appendages. If there were no other reason to separate *palarica* from *stygne* than the outline of the clasps, I should certainly say they were not distinct. Still there is a difference by which *palarica* differs from all forms of *stygne* I have examined, and in which *bejarensis* is distinctly *stygne* and not *palarica*. The difference is slight and difficult to seize, but in some specimens all mounted in the same way, and at the same time,* of *palarica*, and of Pajares *stygne*, the difference is constant. In specimens otherwise mounted it would probably express itself differently. In these preparations, the head of the clasp in *stygne* expands gradually from the neck, and is therefore long and not very broad; the back of the clasp is in one continuous curve, and there is a distinct notch or step at the back of the head. In *palarica* the neck is narrower and continues narrow, and the back of the clasp being, for some distance above the neck to the end, straight and having no notch at the end, the head instead of having nearly parallel sides, and so of quadrilateral form as in *stygne*, has the front line at a considerable angle to the back, and the head looks somewhat triangular. The terminal serrations are less visible in *palarica*, being forced under one edge, instead of being marginal. This shows that the differences are due in some degree to a different amount of twisting in mounting, caused by a difference in form, not necessarily, however, that presented in the preparations.

The form of *stygne* with the nearest approach of clasp form to that of *palarica* is var. *pyrenaica*, but it is distinctly *stygne* and not *palarica*.

In *palarica* the side processes of the tegumen are constantly though slightly longer than in *stygne*. Notwithstanding the relative sizes of the insects, the clasps of *stygne* and of *palarica* are of almost identical size, that of *stygne*, var. *bejarensis*, being longer.

This is decidedly another character making *bejarensis* a variety of *stygne*, and *palarica* distinct. Contrary to what perhaps one would expect, when geographical forms differ in size, the size of the clasps differs also; this is very marked in *æthiops* where the large continental form has a clasp large in proportion compared with the British form.

* By dividing the chitinous ring in the central line between the clasps, and opening it out on the slide, so that the two clasps are at each end of the preparation.

So if *palarica* were a variety of *stygne*, one would expect to find the clasp large proportionally, instead of, as it is, just the same size. The ♀ appendages also differ a little, especially a hemispherical hollow is rugose in *palarica*, much smoother in *stygne*; but I know so little of these appendages, not even the names of the several parts, that I can give no opinion as to the value of the difference, nor have I examined examples enough to know whether they are constant.

Palarica being thus differentiated from *stygne*, one for the moment forgets the many points of resemblance, especially the close resemblance of the appendages, and the general scheme of colour and markings. In both these respects even, it is, however, more distinct from *stygne* than *curyale* is from *ligea*, or *nerine* is from *melas* (not *lefebrei*, which is a very different thing). Are all the other Spanish forms of *stygne*, *stygne*, or are any of them *palarica*? When in the field I thought that *palarica* was possibly an extreme form of *bejarensis* trusting merely to memory, the two points of large size, and dissociation from *evias* in which they agreed carried too much weight. A mere glance at the specimens when together is enough to show that *bejarensis* and all the others are *stygne*, *bejarensis* is certainly extreme, but *peñalaræ*, though differing in some directions, is fairly intermediate between *bejarensis* and *hispanica*.

I am not sure that I have not too much laboured the distinctions between *palarica* and *stygne*, as it would not surprise me to find that a majority of Rhopalocerists, looking at the specimens in my boxes, where the constancy of the two forms in good series is so manifest, and their facies so different, would off-hand say they are unquestionably distinct.

The small *stygne* of the Puerto de Pajares is intermediate between what I take to be typical *stygne* and the var. *hispanica*. I do not think it enough removed from either to require a varietal name, though it is a fine, large, bright form, and is rather *hispanica* if a name be necessary.

The keynote of *E. stygne*, var. *hispanica*, was its approximation in size and markings to a form of *evias* that met it half-way in this respect, and that flew along with it. I believe Mrs. Nicholl's specimens in the B. M. show that *stygne* and *evias* are similarly associated at the Picos de Europa, they ought therefore to be similarly associated at

Pajares. Probably they are. I took one ♂ specimen of *evias* at Pajares; it was a form that might very well be associated with *stygne*, but as a matter of fact I took it some 200 yards from the nearest *stygne* ground, at about 5000 ft., and I took but the one. Why? it was not in fine condition but not so bad as to show that the species was over.

I also took one ♀ specimen of *evias* at a long distance from the ♂ specimen. It was associated with small *stygne* at the highest point at which I found them, a small colony at 6000 ft. on very steep impracticable rocks, so that I only took two specimens. *Evias* may have been in greater proportion to the *stygne* here as I found one *evias* to two *stygne*, but the whole colony was a very small one, as, though I could not traverse the rocky slope, I easily got round it except at one side where it ended in a precipice. This ground was about 50 ft. above the upper margin of one of the highest localities for *palarica*.

Why was *evias* so rare? Was this a bad season for high-level *evias*? I will explain immediately what I mean by high-level *evias*. It was not for want of going over plenty of ground that I found only these two.

On going rather later (July 24th) to the Guadarrama, we hunted well the slopes of the Peñalara, whence our President brought one specimen each (taken in 1902) of *stygne* and *evias*, taken together, and so alike as to leave no doubt they were mimetically associated on the Peñalara as we found them on the Sierra de la Damanda at Canales. On the Peñalara we found *E. stygne*, var. *peñalaræ*, in considerable numbers, unfortunately in a very poor condition, except on some very rough ground near the top, where they were less common and almost impossible to take. As I brought home some 30 specimens I must have handled 50 or 60 specimens. Amongst them was not even one *evias*. I can only suppose *evias* was for some reason very scarce. We were not too late to have seen some old worn specimens, and I specially took many worn individuals in hopes they might afford an *evias*; they were all, however, *stygne*.

In what I have just said about *evias*, var. *peñalaræ*, some one may perhaps think I am casting some doubt on the President's specimen, that he got it somehow mixed up. If I thought so, I should say so, and no one who knows the President would think such a thing likely. But the

specimen itself is abundant reply to all such doubts, it is just such an *evias* as one would expect to find on Peñalara with *stygne* and is not precisely like any other race of *evias*. Why did I get none? Why did I get only two at Pajares? I incline to believe that *evias* was scarce this season, but I don't know. This brings us to another point which concerns *evias*, which I cannot do more than open up, my own observations being too few to settle anything.

It is this, we have found at three or four places in Spain, a small form of *evias* associated with *stygne*, at a fairly high level, and in each place the two species have a special similar facies. This form occurs about mid-July. But at the end of May there occurs apparently over a large part of Spain, a low-level *evias*. I have never taken this form, being always too late for it on my visits to Spain. But I saw a number this year in collections at Madrid. Like the high-level form, it very probably varies a good deal at different stations, but those I saw at Madrid were large and brightly coloured, like large Swiss specimens, such as I have taken at Locarno, with the rusty marks bright and ruddy, and not yellowish, as in var. *hispanica*, and probably four or five mm. more in expanse than that var. and five or six more than var. *peñalaræ*. Sr. Zapater records both forms from the Teruel district, and Mrs. Nicholl has reported low-level *evias* from various localities, and there are other records. What is the relation of these high- and low-level forms of *evias* to each other? The low are large, bright, early, and self-dependent; the higher, smaller, yellower, later, and associated with *stygne*. Are they syngamic? With only our present light on the matter, I incline to answer "yes," but with hesitation; we have no experiment naturally provided as in the case of *E. stygne* and *palarica*.

I can only repeat that *E. stygne* and *E. evias* in Spain still present many interesting questions for investigation.

High- and low-level *evias* are to a great extent *evias hispanica* and *evias evias*, but I do not think we have evidence to justify such an identification. In fact, Mrs. Nicholl takes *evias evias* at high levels, and *evias hispanica* in Albarracin is not decidedly a high-level form.

Appended is a table of the wing expanse of the varieties of *stygne* and *evias* I have met with, and of *palarica*—in some instances founded on too few specimens to be trustworthy, still the best I can obtain for comparison.

I must note that most of my measurements were made from the insects as set, and are probably two or three mm. too small. I notice that Ruhl's measurements quoted seem small, and I suspect were made in the same way (from tip to tip) in insects with the wings much advanced and therefore in some cases quite five mm. too small.

I add also a note of the varieties of the three species known to me from Spain.

I was successful in getting both *E. stygne* and *palarica* to lay eggs freely by sleeving them over grass.

Unfortunately, being on the move prevented my making such notes of the eggs and young larvæ as I should have liked. I sent a number of eggs to Mr. H. Powell, of Hyères, whose knowledge of Satyrid larvæ is more extensive than that of any other of my entomological friends. I append his notes and my own. The difference between the eggs struck me at first as being considerable, the one have the minute dots that form the coloured patches in few and large groups, the other in smaller but more numerous ones: this conclusion was reached on the first eggs laid by each species, and were those of one female of each. Later when I got eggs laid by several others, I found that these differences were not specific but individual. Each female laid eggs all alike in these markings, and differing more or less from those laid by others, but each species seemed to have practically an identical range of variation in this respect.

Mr. Powell agrees with me in two points. First, the eggs of the larger species are rather the smaller, and, secondly, there would be no difficulty in separating the newly hatched larvæ of the two species if mixed. Curiously, however, Mr. Powell says that the larva of *palarica* is darker than that of *stygne* (though he says that within the egg it is lighter), whilst I note the pale lateral stripes as being rather paler. I agree with him, however, in the stripes being better marked.

I agree with him also in another point that is probably of considerable importance. I supplied both larvæ with a grass (*Festuca ovina*, or something like it) from *stygne* ground, and *stygne* did well on it, and when (at La Granja) I had to find a substitute (I fancy another var. of the same grass), they ate that also, and I succeeded in bringing them home, and believe I have some alive now (Dec. 1904). The *palarica*, however, did badly on the

same grass, and at La Granja, gradually starved themselves, and died. I got none home alive. This clearly indicates a different taste in food-plant, as Mr. Powell also points out, though he was handicapped by a Riviera summer, practically making grass unobtainable.

Small *stygnc* eggs laid July 14th and 15th, are pearly white when newly laid, but soon become slightly brownish. This is due to a general change of colour, but chiefly to a development of brown patches, each consisting of an agglomeration of dark dots. These vary very much in their disposition. In one or two cases the dots are nearly uniformly distributed (not in patches). The patches may be four or five in the length or width of the egg, with small spaces between, or they may be much smaller, so that there are eight or ten to the length of the egg. On some the dots are distinctly in regular rows in each patch.

They vary a little in size and shape, about 1.3 mm. high, and 0.8 wide, a little narrower at the top, but maintaining width to close to each end. There are 22 ribs, varying from 20 (one counted) to 24 or perhaps 25. The ribs are high but not sharp, and may be a little waved. They never branch or anastomose, but end at top by merging in an area that looks beaded (high power not available). The secondary ribs are poorly marked but very distinct when a suitable light falls on them.

Large *stygnc* (*palarica*) eggs laid July 16th and 17th, same as small. They are perhaps those of one ♀ only, but they are very uniform in size of red-brown patches, viz., about 5 or 6 across egg and ribs seem most usually 24, but one is found with 21.

In the individual variations of the eggs it is difficult to be sure of size, but that of *palarica* seems to be fractionally less than of *stygnc*—1.2 instead of 1.3 mm. Each ♀ seems to lay eggs of a similar facies, with the later smaller and even stunted and deformed. Later layings by other ♀♀ of *palarica* showed the range of variation in the egg markings to be practically the same in both species.

The eggs of both hatched between July 31st and August 2nd. The young larvæ are very nearly identical. The large *palarica* seem the paler in having the dorsal band slightly narrower and the lateral line is lighter in colour. It might be called white in the larger (*palarica*), yellow in the small (*stygnc*), but this would exaggerate the difference.

The following description was taken some time after returning home; it may have some value as a description of first stage of *stygne*, but *palarica* having all died, it is useless for comparison with that species, still less, of course, will the later stages have the value hoped for when I thought I might rear both species.

Erebia stygne (small form), Aug. 24th. Larva full-grown in first stage, length 4·8 mm., head looks very small, about 0·5 mm. wide, forward segments being quite 0·9. It tapers very steadily from 2nd or 3rd abdominal to tail, 9th abdominal segment being about 0·5 mm. across, 10th smaller.

Ground-colour whitish *terra-cotta*, a narrow dorsal red-brown band (or line) broadest at 5th or 6th abdominal. Then a broad pale band, which includes both I. and II., which are widely apart, one at front, other at hind-margin of segment, and II. quite twice as far from middle line as I. Next, a narrow red line, then a pale one, nearly white, *i. e.*, decidedly lighter than general ground-colour. Then a broader dark band, paler than the others owing to a good deal of marbling of pale ground-colour in it, in this is III. Then a very narrow whitish band and a very narrow brown (or reddish-brown) line in which is spiracle. Then a broad yellowish-white band in which are IV. and V. The anterior much the lower and the line of spiracle just between them. Then a narrow reddish band, a slightly broader pale one, and a narrow weakly-coloured dark one. Below this is the proleg with two hairs at margin, and on 1st and 2nd abdominal one hair in place of proleg, and another more ventral (this may be more in situation of proleg), a minute one still more ventral. No hair or tubercle is found on the three lines below the band carrying IV. and V. Legs and prolegs pale fleshy, four hairs and three dots like hairless tubercles on claspers. Head round, with fine wrinkling, making it rough. The anterior ocellus very large and prominent; the second smaller, but very similar and very close to it, the others flat and inconspicuous. The two first have pigment in the epicranium, as well as the mass beneath. The head also carries a number of hairs of the same colourless texture with rough surface, curved and clubbed, as those of the ordinary tubercles. The anal plate carries four hairs on conical tubercles along its posterior margin, and one in either side higher up. On the prothorax is a small plate on either side with four hairs, two in front and two further back. Further down in line with plate, and well above, and in front of spiracle, is a double tubercle of which the front hair is short and curved like the others, but the second though transparent and rough (not spiculated) like the others is straight,

and four or five times their length. Below is a tubercle with one very short clubbed hair. This is as much below spiracle as the double one is above it. Thoracic 2nd and 3rd have I. and II. single and in the same transverse line as is III. which is however double, it is exactly in line with III. abdominal. Below and quite to front of segment, is a single tubercle. This is below line of spiracle but above IV. and V. Lower is a single tubercle at base of leg (on prothorax two). Prolegs have six hooks in single line, claspers eight. The terminal bristle of the antenna rather long, three times the rest of the antenna, or nearly so. The bristles are rather longer than elsewhere, round the mouth region. The hairs of tubercles are very small, curved backwards and slightly clubbed, transparent, and with a roughened surface, in length, perhaps 0.06 mm.

The following are Mr. Powell's notes.

Erebia stygne.

"Ova received from Dr. Chapman, July 21st, 1904.

"The eggs are fixed to blades of grass.

"*Shape*. Oval, with a flattened base concave in the centre. The top is only slightly flattened.

"*Appearance*. Pearly with a pinkish tinge, blotched with reddish-grey. Vertical ribbing quite distinct under hand-lens. Height, 1.2 mm. Greatest width, .9 to 1 mm.

"*Under Microscope* $\times 50$. There are 21 (sometimes 22) vertical ribs running from the edge of the base to the top, where they become rather lumpy and broken, dying out on the nearly smooth area around the micropyle. They are blunt-edged, with gently sloping sides. The cross ribs are numerous, and of course very much smaller and lower than the others. They constitute the long sides of cells, the tops of the vertical ribs forming the short sides. On the top of the egg the cells are large and irregular in shape, triangular, lozenge-shaped, etc. They diminish very much in size as they near the centre, in which is the invisible micropyle. There is no depression at the top, but in a *few* specimens the centre is occupied by a low, roughened pimple formed by a bunching-up of the lumpy ends of the ribs. The blotches observed under the hand-lens are seen to be composed of pinkish or chocolate-coloured specks arranged in loose groups.

"These groups are beneath the eggshell. That they are directly connected with the living contents of the egg

there is no doubt, for they can be seen to move backwards and forwards together, always keeping the same relative positions. The movement is a fairly brisk one, reminding one of a shrug of the shoulders. It can be induced by breathing upon the egg, or by giving a tap to the support on which it rests, but it occurs from time to time even when the egg is unmolested. Many other (perhaps all) *Erebix* ova develop these pinkish blotches after a few days. I have seen something similar in *Canonympha*. The base of the egg is covered with large shallow cells of irregular shape. Before hatching the colour darkens to dull fleshy grey, there being darker and lighter patches. The groups of specks disappear when this change takes place, and the shape and markings of the larva are seen through the shell. The head occupies all the upper part of the egg, while the body is curled round horizontally with the extremity turned downwards. The numerous pits on the head show through as brown dots. The two groups of beads (*ocelli*? one on each side) are very clear, so is the mouth and the arch above it. The markings of the body (lines and tubercles) are quite distinct. The larvæ commenced to hatch out on July 23rd, and all were out by the evening of July 24th. They eat away the top of the egg in a circle, emerge through the hole made, and eat up the rest of the egg or part of it.

“The newly-hatched larva is 28· mm. long when still, but can reach 3 mm. when walking. Width of the head 0·7 mm. It is a large head, and is higher and broader than the body, which tapers to begin with, down to the forks. The colour is that of most newly-hatched Satyrids, a sort of pale straw. The shape and markings of the head are typically Satyrid. It is rounded, rather flattened in front; much resembles a lemon rind in pitting and polish. The pits are large. Depression between the lobes very shallow. The side ‘beads’ (*ocelli*?) are large, dark brown, and shiny. The usual small, brown seta patches are very distinct. Setae short, transparent, curved forward. Those just over the mouth are longest.

“The 1st division of the 1st thoracic segment has 16 small beady-brown tubercles arranged transversely but not in an exact line. The 2nd and 3rd thoracic segments have both a dorsal dark-brown tubercle-bead outside the dorsal stripe. In a line with it on the sub-dorsal stripe they have another bead. The abdominal segments have the first bead on the 1st sub-division, and in a line with those

on the thoracic segments. They have the second bead at the other end of the segment and *just above* the sub-dorsal stripe. Another line of large tubercle-beads (one in the centre of each segment and nearly in a vertical line with the spiracles) runs down the larva between the spiracular and supra-spiracular stripes. These last beads are *doubled* on the 2nd and 3rd thoracic segments. They generally approach the supra-spiracular stripe, entering its lower edge on the 6th abdominal segment and remaining in the stripe afterwards. Above the lateral border are two small beads, the first in the front of the segment, the other farther back and higher. All beads have short transparent hairs. The feet and claspers have each two or three beads bearing longer hairs than those on the body, with the exception of those growing from the tubercles on the 8th abdominal and anal segments.

“There are three conical tubercles on each fork (last segment) pointing backwards and giving rise to single, rather long, transparent hairs. One of these tubercles terminates the fork; the two others are lateral. The ground-colour of the body is a pale straw-grey. The stripes are pinkish-brown. Dorsal line weak on the thoracic segments, well-marked on abdominals. Sub-dorsal line narrower but better marked on the thoracic segments. Supra-spiracular and spiracular both well marked, the former thickening as it runs down the body, and continued along the edge of the forks. The space between the lateral edge and the spiracular line is very light. Beneath the edge, and therefore within the limit of the ventral surface, is a very narrow pinkish-brown line. The stripes are broken by the segmental and sub-segmental incisions. The dark colour does not penetrate the crevices. This is most marked in the case of the sub-dorsal and supra-spiracular stripes. Ventral surface, claspers and feet of the usual pale straw-colour. Forks: short, thick, and lying close. Claspers on last segment large, with several hair-bearing tubercles. The spiracles are round, dark-brown beads, no larger than the tubercles above them except on the 1st thoracic and 8th abdominal segments, but they are rather lighter in colour.

“The larvæ ate the grass I was able to give them, but it was too tough and dry to nourish them properly, so they soon died. No good grass was obtainable owing to the drought. In course of time I was able to improve the grass by watering, but it was then too late.

“*Erebia palarica.*

“Ova received from Dr. Chapman, July 21st, 1904,

“The eggs are fixed to blades of grass,

"As the egg is much like *stygne's* I will not go through all the details again, but will note the points of difference.

"*Size.* All those observed were distinctly smaller. Height, 1.0 mm. to 1.1 mm. Greatest width, 0.85 mm.

"*Colour.* Whiter.

"*Number of vertical ribs,* 22 to 24, none with less than 22.

"The arrangement of cells at the top of the egg is on the whole more regular, and the top looks smoother, but this is not always the case. None of the eggs have anything like a central pimple, however, as seen in a few *stygne*. I do not consider this is a good distinction, for I have noticed that in some Satyrids the top of the egg varies in the same species. *S. cordula*, for instance, has sometimes a decided cone around the micropyle owing to the bunching of the lumpy extremities of the ribs; in other specimens the top is fairly level.

"The specks beneath the shell are less numerous, and rather smaller. The groups are better defined, not so straggling; they are browner, not so pink. The same movement is observable.

"Before hatching, the eggs underwent similar changes to those noted in *stygne* but without becoming *quite* so dark. Hatching commenced on July 23rd, and all the young larvæ were out by the afternoon of the next day.

"*Larva* is smaller than *stygne*. Length, when first hatched, 2.6 mm., when walking, about 2.8 mm. Width of the head, about 0.6 mm.

"The larva is darker in appearance than *stygne* and that is on account of the stripes which are more strongly marked, especially the supra-spiracular stripe. The ground-colour is the same in both. If the larvæ are mixed together it is quite easy to separate them without any possibility of a mistake.

"I gave these larvæ *Brachypodium pinnatum*, but was unable to get any with fresh shoots. I also tried them with a *Festuca* which I had in a pot, but it had only a very few green blades. I tried them with a third grass, but nothing suited them, and they quickly dried up, *without having eaten anything at all*, as far as I could see. They perished several days before the *stygne* larvæ. *Stygne* ate *Brachypodium* and another grass, and if they could have got some fresh shoots I have no doubt they would have lived."

It may be proper to give a short diagnosis of:

Erebia palarica.

Colour and markings like *E. stygne*, except in the inner margins

of the elements of the red blotches, being notched and receding, instead of convex and advancing, in the under-side of ♂ hind-wing being often more distinctly marked, and in the red blotch in the ♀ upper wing being continued to costa as a whitish or greyish shade. Appendages, head of clasper more triangular and more definitely marked off by a narrower neck. Expanse 53-64 mm. Habitat, Cantabrian range at Puerto de Pajares, and Picos de Europa, and probably elsewhere.

I will place type specimens in the National Collection.

Erebia stygne, var. *peñalaræ*, is diagnosed in Proc. Ent. Soc., 1904, p. xlvi, from one specimen only. The series taken this year shows that the race is one of the most variable of *stygne*. Some are not very different from those taken at Pajares. Others are like that described, and not a few vary even more, so as to seem to be quite on the way to a form like *bejarensis*. The ♀♀ show more markedly than the males the remarkable inward extension of the red blotches, which is carried so far in *bejarensis*. In expanse it is smaller than the *hispanica* form from Canales, but larger than that from Pajares.

The two *evias* taken at Pajares are small, and are of different types, but are within the limits of variation of *E. evias*, var. *hispanica*, but a good way from its average type. The high-level ♀ is so very like the ♀ of *stygne* taken at the same time and place, that I did not recognize the specimen as *evias*, even when I had got it home and set it, and only discovered it on critically examining the specimens afterwards.

Mrs. Nicholl has kindly lent me three specimens, which I may note as a specimen of *E. stygne* of fairly ordinary type, 48 mm. in expanse, one of several taken on Mont Seny, 6000 feet, near Barcelona, date not given. Mont Seny is almost a spur of the Pyrenees; this specimen, with several taken by Mr. Burr, one over the frontier at Sallent, May 29th, 1904, proves, what we had no record of before, but which nevertheless every one supposed to be the case, that *E. stygne* occurs on the south as on the north slope of the Pyrenees, and no doubt more or less throughout the range, and probably abundant enough. The other two specimens are in response to my request to see the most extreme form of *evias* from the Albarracin district. One of these, expanse 50 mm., is a male taken early in July on the summit of Sierra Camarena (Javalambre,

6000 feet). This specimen is identical with not a few of those from Canales. The other is a very dwarf ♀ from Tragacete, June 29th. This is probably a genuine aberration as regards size, being only 40 mm. in expanse as compared with smallest from Canales, 44 mm., or both measured as set 38 mm. and 41 mm. Otherwise, as regards form, colour, markings, etc., it agrees exactly with various Canales specimens. These from their locality are true var. *hispanica*, Zapater, and go to show that *hispanica* is a high-level form of *evias*, in the Teruel district as elsewhere.

What we know of the geographical distribution of these butterflies is too fragmentary to take us very far, but it is sufficient to afford a few interesting considerations. Assuming the *Erebias* to have reached Spain *viâ* the Pyrenees, whilst it is just possible that *zapateri* may have reached the localities where it has developed its peculiar character by way of the coast hills, for the most part we find the Pyrenees so absolutely cut off from the rest of Spain, so far as mountain forms are concerned, by the wide and low valley of the Ebro, that the *Erebias* must first have travelled westward into the Cantabrian range before they could circle round the head waters of that river. It was probably at a very early date that *palarica* broke away from *stygne*, probably as early as the parting of *zapateri* from *neoridas*.

It is, however, with *stygne* and *evias* that we are more concerned. At the Picos de Europa, 180 miles west of Pyrenees, the two species are still but little differentiated from their mid-European types, nor is it clear that *evias* has a high- and a low-level form distinguishable from each other.

Mrs. Nicholl at Aliva on the high slopes of Peña vieja, 5000 feet, met on "July 12th with one poor *evias*, many *stygne*. July 14th, one nice ♀ climbing Peña vieja. July 17th, on the Col de las Nieves (at least 6500 feet) a few *evias*. July 18th, above Aliva, about 6000 feet, *evias* much battered, could scarcely get any good ones." She writes that she has in her collection only four specimens of *evias* from the Picos, "of which three are ♀♀, large and much spotted; I caught many that I did not keep as they were over, except a few very high up. They are very different to the small form from Aragon. The type of *stygne* was very common on all the Picos, up to the middle of July, on the southern and eastern sides of the range; I saw few

or none afterwards on the west and north faces of the same mountains, and I saw remarkably few butterflies on the west and north of the Picos."

There are, as I have already noted, two Picos *evias* in the B. M. collection; unfortunately they have only generalized labels, but one seems to be like the low-level forms, the other approaches the high-level one.

Going sixty miles further west to Pajares, we find *stygne* less abundant, its habitat even restricted, but common enough where it occurred. The three localities I most closely examined were, first, the high-level one already noted (over 6000 feet), I met with no other so high; with these a definitely high-level form of *evias*. Second, at the Puerto and extending for a mile along the north (Asturias) side of the col, but not apparently reaching very far either up or down from the 4500 feet level. The aspect would be N. and N.W. The third locality was nearly two miles below the col on the south side (Leon) at about 4250 feet, a comparatively small patch of a few hundred acres, with a westerly aspect.

We took specimens at a few other localities, but not in circumstances to enable us to say what might be the extent of the habitat, but generally these places had an easterly aspect and were at about 4500 or 5000 feet. One *evias* of doubtful high-level type not closely associated with these. These *stygne* from Pajares make a certain approach to the *hispanica* form, so that it is convenient to call them so, but many individuals are little if at all removed from the ordinary type.

It would be interesting to know what forms occur further west in the corner of Spain to the north of Portugal and in Portugal itself, but for the present this is a blank. The next point is at Canales to the south of the Ebro. Here *stygne* and *evias* are both modified by way of approach to each other, and fly together in about equal numbers. *Evias* probably has a low-level form here. The high-level one with *stygne* is of the form *hispanica*, but only a few reach typical *hispanica*, others still retain something of ordinary *evias*. The *stygne* is less variable than at Pajares, is two mm. larger and averages larger than the associated *evias*. Forty miles east of this, at Moncayo, the same form of *evias* is found, but we saw no *stygne*; possibly it does not occur there, as *stygne* seems to fail eastwardly, *evias* towards the west.

Passing now to the Guadarrama, S.W. from Canales something more than 100 miles, and at an elevation of 6000–8700 feet, we find a still more specialized form of *stygne*, very variable, from forms nearly typical to the peculiar *peñalaræ* and to forms as bright as *bejarensis*. These are associated with an equally specialized high-level *evias* of rather small size, and very different from the low-level form of the same region.

A hundred miles to the west of this is Bejar, at about 5000 feet. *Stygne* occurs in a very large highly-coloured form, but there is no record of *evias* with it. Nevertheless the association of the two species in the Peñalara and the approach made by many specimens of *stygne* there to the var. *bejarensis*, seems to lend a little further plausibility to my suggestion that *stygne*, var. *bejarensis*, owes its largeness and brightness to association with *evias*, though that species appears to have failed to go (at least in a high-level form) so far to the south and west.

A hundred miles east of Madrid in the Albarracin and neighbouring Sierras occurs *evias* apparently in ordinary large red form and in the special small yellow form, *hispanica*. I have no information to show whether these are in any sense a high- and low-level form. It seems certain that there is no *stygne* here. And a high-level *evias* apparently implies *stygne*. Nevertheless, I will venture the suggestion that *evias hispanica* in the Teruel district has, as it were, got there *viâ stygne*, even though that species could not follow, just the converse of what I suggest about *stygne bejarensis* to the west. The resemblance of the two forms of *stygne*, and the fairly continuous range of Sierra, from Peñalara to Bejar, would suggest that Bejar was reached *viâ* Guadarrama; whilst the Teruel district was reached from the Canales area, *viâ* the head-waters of the Duero and the Jalon, would be the conclusion for similar considerations in the case of *evias*. I saw no *stygne* in the Albarracin Sierra, and incline to believe it is really absent, the Sierra not being lofty enough, as it hardly comes below 7000 feet on the Guadarrama in same latitude; so far east in this latitude it is also possibly too dry.

<i>Erebia palarica</i>	.	.	Picos de Europa.	1902.	Nicholl.
"	"	.	Puerto de Pajares.	1904.	T. A. C.

<i>Erebia stygne stygne</i>	.		In Pyrenees (Spanish side). Burr. 1904.
"	"	" ^{or}	} Picos de Europa. Nicholl.
"	"	<i>hispanica</i>	
"	"	"	× Puerto de Pajares. T. A. C.
"	"	"	○ Canales de la Sierra. T. A. C.
"	"	<i>peñalara</i> ++	Guadarrama. Spanish Collection. Poulton. 1902. T. A. C. 1904.
<i>Erebia evias evias</i>	.	.	Picos, Guadarrama, Teruel and probably many other places in Spain.
"	"	<i>hispanica</i>	× Approaching Puerto de Pajares. T. A. C.
"	"	"	○ . Canales de la Sierra.
"	"	"	○○ . Teruel.
"	"	<i>peñalara</i> ++	Guadarrama. Poulton. 1902.
"	<i>stygne bejarensis</i>	○○	Bejar. T. A. C.
		×	associated.
		○	"
		++	"
		○○	apparently unassociated with any form of the other species.

I add a Table of the expanses of the various forms of these species so far as my material allows.

Millimetres	<i>Stygne.</i>		<i>* Stygne.</i>		<i>* Evias.</i>		<i>* Stygne.</i>		<i>* Evias.</i>		<i>Stygne.</i>		<i>Evias.</i>		<i>Evias.</i>		<i>* Stygne.</i>	
	SWISS.		CANALES.				PEÑALARA.				PICOS DE EUROPA.				PAJARES.			
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
38	1		...		...		...		...	...		...		...		...		...
39			...		...		...		...	...		...		...		...		...
40			...		...		...		...	...		...		...		...		...
41		Ruhl.	...		...		...		...	...		...		...		...		1
42	2	2	...		...		...		...	...		...		...		...		1
43	...		...		...		...		...	...		...		...		...		4
44	...		...		1		2 1		...	...		...		...		...		5 2
45	1		1 1		5		2 1		...	1		...		...		1		9
46	...		...		4 1		3 2		...	1		•		1 •		...		7 3
47	...		2 1		8 7		5 3		1 •	2		...		...		...		13 3
48	...		11		12 4		1 2		...	...		...		...		...		9 1
49	...		6 • 2		15 1		2 4		...	...		...		...		...		4
50	...		5 1		7 1		1 2		...	...		...		...		...		1 1
51	...		5 3		4 2		2 1		...	...		•		...		...		1
52	...		3		3 1		...		...	...		...		...		...		1
53	...		1		...		...		...	...		...		...		...		...
54	...		...		...		...		...	...		...		...		...		...
55	...		...		...		...		...	...		...		...		...		...
56	...		...		...		...		...	...		...		...		...		...
57	...		...		...		...		...	...		...		...		...		...
58	...		...		...		...		...	...		...		...		...		...
59	...		...		...		...		...	...		...		...		...		...
60	...		...		...		...		...	...		...		...		...		...
61	...		...		...		...		...	...		...		...		...		...
Total specimens	4	2	33	9	59	17	18	16	1	—	4	—	2	—	1	1	55	11
Mean expanse	42·0	46·0	49·0	49·4	48·3	48·2	47·2	47·8	47·0	—	46·2	—	48·5	—	46	45	46·24	47·0

* In these columns measurements are taken without allowance for setting, true expanses are therefore nearly 2 mm. Mean expanse, or a solitary specimen.

* <i>Palarica</i> .		<i>Stygne</i> .		* <i>Bejarcensis</i> .		<i>Evias</i> .		ACCORDING TO RUHL.															
PAJARES.		HIGH LEVEL PAJARES.		BEJAR.		SWISS.																	
♂	♀	♂	♀	♂	♀	♂	♀																
...	...	...	...	...	...	—	—	Kane and Lang.	<i>Parnenio.</i>	<i>Cyclopius.</i>	<i>Embla.</i>	7 next largest <i>Erebia.</i>	Small Swiss <i>stygne</i> in B.M.					
...	—	—						●	<i>evias peñalaræ</i> type 47.									
...	—	—						●	<i>stygne peñalaræ</i> type 41.									
...	—	—						—	—	—	—	—	—					
...	1	...	—	—						Ruhl.					Largest Pyrenean (French) <i>stygne</i> in B.M.					
...	1	...	—	—											●					
...	...	●	1	3	2	—	—											—	—	—	—	—	—
...	...	1 ●	...	4	1											—	—	—	—	—	●
...	3	2						—	—	—	—	—	—	—				
...	1	3						—	—	—	—	—	—	—				
...	1	...	...	1	●	2	...	—	—	—	—	—	—	—							
1	...	...	...	2	2	...	...	—	—	—	—	—	—	—							
4	2	...	...	...	...	2	†	—	—	—	—	—	—	—					
9	3	...	...	...	...	...	...	—	—	—	—	—	—	—			
Picos.	...	...	...	...	...	...	...	—	—	—	—	—	—	—		
26	1 8	...	...	...	1	...	...	—	—	—	—	—	—	—							
28	9	...	...	...	1	...	...	—	—	—	—	—	—	—							
●	●	—	—	—	—	—	—	—									
26	6	...	...	...	...	...	...	—	—	—	—	—	—	—			
12	3	...	...	...	...	...	...	—	—	—	—	—	—	—			
7	6	...	...	...	...	...	...	—	—	—	—	—	—	—			
2	...	...	...	...	...	...	...	—	—	—	—	—	—	—		
115	38	1	1	16	9	6	1	—	—	—	—	—	—	—									
57·2	57·25	49	47·6	49·7	52·	52·0	49	—	—	—	—	—	—	—									

greater than set down. e.g. Several *palarica* accurately measured are found to be 63 and 64 mm. in expanse.

† Two largest Swiss in B.M.

EXPLANATION OF PLATES II, III, IV, V, VI.

PLATE II.

-
- FIG. 1. *Erebia palonica*, ♂ upper side.
 2. " " " under "
 3. " " ♀ upper "
 4. " " " under "
 5. " *stygne* from Puerto de Pajares, ♂ upper side.
 6. " " " " " " under "
 7. " " " " " ♀ upper "
 8. " " " " " " under "
 9. " *erias*, var. *hispanica*, from Canales, ♂.
 10. " " " " " Pajares, ♀, only specimen
 of high-level form taken.
-

PLATE III.

-
- FIG. 1. *Erebia stygne*, ♂ Swiss, upper side.
 2. " *erias*, ♂ Digne " "
 3. " *stygne*, var. *hispanica*, ♂, Canales, upper side.
 4. " " " " ♀ " " "
 5. " *erias*, var. *hispanica*, ♂ " " "
 6. " " " " ♀ " " "
 7. " *stygne*, var. *peñalara*, ♂ upper side.
 8. " " " " ♀ " "
 9. " " " " ♀ under "
 10. " " var. *bejarensis*, ♂ upper "
 11. " " " " ♀ " "
 12. " " " " ♀ under "

PLATE IV.

As a Plate this is open to criticism, but it shows what it is desired to do. Figs. 1 and 2 are *E. stygne*, and 3 and 4 *E. evias*, taken by Mrs. Nicholl at the Picos de Europa in 1902. The two species show some little approach to each other, but one at least of the *evias* is clearly the ordinary form, and these and other specimens leave it doubtful whether *E. evias* has here made any recognizable progress into the division into a large, bright, low-level, early form (*evias*) and a small, pale, high-level, late form (*hispanica*). Figs. 5 and 6 are Professor Poulton's two specimens, one *evias*, one *stygne*, from Peñalara. The *evias* (var. *peñalaræ*) is clearly a high-level form, but specially varied to agree with the *stygne* (var. *peñalaræ*) rather than quite like var. *hispanica*.

PLATE V.

Sketch map of the northern half of Spain, showing habitats of *Erebia palarica* and of *E. stygne* and *evias* and their varieties. The lines connecting the stations for *evias* and *stygne* mark the progressive variation of *E. stygne* to successively vars. *hispanica* (Canales), *peñalaræ* (Peñalara) and *bejarensis* (Bejar), and of *evias* to vars. *hispanica* (Canales and Albarracin) and *peñalaræ* (Peñalara). Low-level (type) *evias* is more widespread (as the others probably are also) than is indicated on the map.

PLATE VI.

- FIG. 1. Eggs of *Erebia palarica* $\times 10$.
 2. „ „ „ *stygne* (Puerto de Pajares) $\times 10$, both from photographs by A. E. Tonge, Esq.
 3. Clasp of *E. palarica* $\times 24$.
 4. „ „ *E. stygne* $\times 24$.